

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution
higher education
NORTH CAUCASIAN FEDERAL UNIVERSITY

I APPROVE

Dean of the Faculty of Mathematics
and computer science named after
Professor N.I. Chervyakov , candidate
physical and mathematical sciences, associate professor

Grobova T.A.

Full name

**ASSESSMENT TOOLS FUND
FOR INDUSTRIAL PRACTICE**

Research Work / Научно-исследовательская работа
name of the discipline (module)

Direction of training	02.04.01 Mathematics and Computer Science
Directionality (profile)	Training Program for Electronic Information
Year of commencement of studies	2026
Form of study	full-time
Implemented in a semester	3.4

Introduction

1. Purpose: conducting ongoing monitoring of academic performance and midterm assessment for industrial practice "Research Work / Научно-исследовательская работа"
2. FOS is an appendix to the industrial practice program "Research Work / Научно-исследовательская работа"
3. Developer Maria Anatolyevna Lapina – Candidate of Physical and Mathematical Sciences, Associate Professor, Associate Professor of the Department of Computational Mathematics and Cybernetics
4. An examination of the FOS was carried out
Members of the expert group:

Chairman L.B. Kopytkova – Chairman of the Teaching and Methodological Complex of the Faculty of Mathematics and Computer Science named after Professor N.I. Chervyakov

(Full name, position)

Members of the Commission: Gladkov A.V. – member of the Teaching and Methodological Committee of the Department of Computational Mathematics and Cybernetics

Andrukhiv L.V. – member of the teaching and methodological committee of the Department of Mathematical Modeling;

Belokon L.V. – member of the teaching and methodological committee of the Department of Mathematical Analysis, Algebra and Geometry;

Representative of the employer organization Podoprigora N.B. – General Director of LLC “Medicine IT”

(Full name, position)

Expert opinion: the fund of assessment tools corresponds to the educational program for the specialty 02.04.01 Mathematics and computer science, profile «Training Program for Electronic Information» and is recommended for conducting ongoing monitoring of students’ academic performance and midterm assessment.

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5. The validity period of the FOS is determined by the period of implementation of the educational program.

1. Description of the criteria for assessing competence at various stages of its development, description of assessment scales

Competence (ii), indicator (s)	Levels of development competence (s),			
	The minimum level has not been reached (Unsatisfactory) 2 points	Minimum level (satisfactorily) 3 points	Intermediate level (Fine) 4 points	High level (excellent) 5 points
<i>Competence: UK-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal</i>				
ID-1 ^{UK-3} Manages the production activities of employees ID-2 ^{UK-3} Prepares and presents presentations of plans and results of personal and team activities	There is no clear distribution of responsibilities and there is chaos in the work. Planning is absent or is carried out formally, and control over implementation is minimal. The management is ineffective, there is a lack of motivation and control over employees. Emerging problems are ignored or not resolved in a timely manner. Production processes are not optimized, which can lead to significant losses of time and resources. Production activities are carried out with serious violations of regulatory requirements. The presentation does not have a clear structure, and the sequence of information	There are gaps in the distribution of responsibilities and coordination of employees. Planning is underway, but there are significant deviations from deadlines and insufficient control. Human resources management is at a basic level and employee motivation is weak. Problems are resolved with delays or not in full. There is no systematic approach to improving efficiency and reducing costs. Production activities are carried out with violations; there are organizational and regulatory shortcomings. The presentation	Responsibilities are distributed, but minor shortcomings in work coordination are possible. The work plan has been drawn up and is being implemented, however, minor deviations from the schedule are possible. Management is good, but there may be minor problems with staff motivation. Problems are resolved in a timely manner, but minor delays or shortcomings in the process are possible. Basic efficiency improvement methods are applied, but the optimization potential is not fully realized. Production activities comply with basic standards,	Employee responsibilities are clearly distributed, and effective coordination of work is ensured. A detailed work plan was developed and implemented, including deadlines, resources, and milestones. Modern methods of personnel management are successfully applied, and employee motivation is ensured. Problems arising in the production process are quickly and effectively resolved. Strategies are applied to improve labor efficiency and minimize costs. Production activities are organized in full compliance with regulatory requirements. The presentation is clearly structured and contains a logical sequence of

	delivery is chaotic. The main aspects of the topic are poorly covered or absent, and the materials are poorly prepared. The slides are overloaded with text, unreadable, or poorly formatted. The speaker reads the text without expression, does not use intonation, and makes many hesitations. There is no interaction with the audience and the material is presented formally. There is a lack of coordination within the team; speakers do not coordinate information with each other. Either he doesn't answer questions, or he does so uncertainly, with mistakes and deviations from the topic.	has a weak structure, and the logic of presentation is broken in places. Only the main aspects are presented, important details or evidence base are missing. The slide design contains too much text, poor color combinations, or sloppy elements. The report is read monotonously, there may be frequent hesitation and a lack of expressiveness. Interaction with the audience is minimal, the performance is more like a monologue. During a team presentation, there is a lack of coordination among the speakers and an uneven distribution of roles. Answers to questions from the audience are given with difficulty, uncertainty or deviation from the topic are possible.	but minor omissions may occur. The presentation is logically structured, but there may be some minor flaws in the logic of presentation. The basic information is presented, but some aspects may be covered superficially. The presentation design is generally high quality, but there may be some text overload or minor visual flaws. The speaker presents the material confidently, but slight hesitation or monotony of speech is possible. There are attempts to interact with the audience, but they are not always effective. There is interaction between speakers, but there may be inconsistency or uneven distribution of	presentation of the material. All key aspects of the plan or performance results are presented and reliable data is used. The slides are professionally designed, the graphics are discreet, the fonts are legible, and the color scheme is not overloaded. The speaker presents the material confidently and clearly, uses expressive means of speech, and maintains eye contact. The presentation is accompanied by explanations, examples, and may include questions for the audience or interactive elements. During a team presentation, the speakers were coordinated, roles were distributed logically, and interaction within the team was smooth. Confidently answers questions from the audience, demonstrating an understanding of the topic and the ability to argue their point of view.
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			roles. Generally answers audience questions, but some answers may not be detailed enough.	
<i>Competence: UK-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction</i>				
ID-1 UK-5 Analyzes and draws conclusions on social, ethical, scientific and technical issues arising in professional activities. ID-2 UK-5 Objectively evaluates the diversity of cultures and identifies their individual characteristics	The analysis is absent or fragmentary. The conclusions are made without justification and contain logical errors. Scientific methods of analysis are not used and there is no systematic approach. Social and ethical aspects are ignored, and the proposed solutions do not comply with professional ethics. The conclusions are impractical and have no value for professional activity. The text is poorly structured, contains many errors, and is unclear. Culture is treated superficially or with errors, and there is a lack of deep understanding of the topic. There are biased judgments, stereotypes, and no	The problem is considered superficially; a comprehensive approach is lacking. The conclusions are not sufficiently substantiated, contain logical gaps or weak argumentation. The application of analysis methods is formal in nature or limited to one approach. Social and ethical aspects are only partially touched upon or considered superficially. The conclusions and recommendation s are difficult to implement in practice and require significant revision. The text contains stylistic and logical errors, and the presentation is unclear in	The analysis covers the main aspects of the problem, but may not be detailed enough. : The conclusions are generally logical and well-founded, but the argumentation may be incomplete or not always convincing. Basic methods of analysis are used, but without in-depth study. In general, social and ethical aspects are taken into account, but the analysis of these factors may not be comprehensive enough. The solutions are applicable, but require refinement or adaptation to specific conditions. The text is	A comprehensive analysis of the problem was carried out, taking into account all significant aspects (social, ethical, scientific, technical). The conclusions follow logically from the analysis, are reasoned, and supported by reliable sources and facts. Scientific approaches, methods of analysis, comparative, critical or systemic analysis are used. Social and ethical aspects are taken into account, and the proposed solutions comply with professional ethics. The conclusions and proposed solutions are applicable in practice and take into account the real conditions of professional activity. The text is presented clearly,

	critical analysis of information. Does not differentiate between cultures or makes significant errors in description. Comparative analysis is absent or made without argumentation. Incorrect statements are allowed, intercultural specifics are not taken into account. The text is unstructured and contains numerous grammatical and stylistic errors.	places. Considers cultural diversity superficially, without deeply exploring its aspects. Stereotypes and lack of critical analysis are possible. Provides general facts but does not emphasize the unique features of cultures. Comparison of cultures is formal in nature or limited to simple statements. Respectful, but may use inappropriate terms or simplistic generalizations. The text contains logical and stylistic errors, and the presentation is not clear enough.	logical and literate, but there may be minor stylistic or structural flaws. Covers the topic well, but may not take into account some aspects (such as economic or historical influence). Generally objective, but some stereotypical or superficial judgments are possible. Describes key characteristics of crops, but does not always emphasize unique features. There are attempts to compare cultures, but not always with clear arguments. Demonstrates respect for cultural differences, but may not take into account all the nuances of intercultural communication. The text is logical and literate, but minor stylistic or structural errors are	logically, without stylistic and grammatical errors. Demonstrates a comprehensive understanding of cultural diversity, taking into account historical, social and economic contexts. Analyzes cultures without stereotypes and bias, using scientific sources and reliable data. Clearly articulates the unique characteristics of different cultures and highlights their distinctive features. Competently compares cultures, revealing their similarities and differences based on logical arguments. Shows respect for cultural traditions, uses terminology correctly, and demonstrates a high level of intercultural competence. The information is presented logically, consistently, competently and without stylistic errors.
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<i>Competence: PC-4 Able to conduct patent research, determine forms and methods of legal protection and defense of rights to the results of intellectual activity, manage rights to them to solve problems in the field of development of science, engineering and technology</i>				
ID-1 _{PC-4} Makes rational choices regarding methods of protecting intellectual property rights; ID-2 _{PC-4} Conducts patent research in the field of computing and communication systems.	Does not have sufficient knowledge about intellectual property protection and is unable to make an informed choice of protection method. Makes mistakes when completing documents, which can lead to registration refusal or vulnerability of intellectual property rights. Does not take into account legal risks, which may lead to the loss of exclusive rights to development or scientific work. Shows no interest in studying legislation and modern methods of protecting intellectual property. Unable to advise colleagues or participate in the process of legal protection of intellectual property. Does not possess patent research methods and is unable to correctly analyze patent information. Makes mistakes in assessing the patentability of	Knows the basic methods of protecting intellectual property, but may have difficulty choosing the optimal method. requires specialist assistance for complex legal issues. Does not always take into account all risks when choosing a protection method, which can lead to insufficient legal protection of the object. Has a superficial knowledge of patenting, licensing and copyright. Updates his knowledge irregularly, which may lead to the use of outdated security methods. Has a general understanding of patent research, but has difficulty analyzing complex technical solutions. Performs patent	Possesses strong knowledge in the field of intellectual property protection, but may not always take into account all the nuances of specific cases. Makes the right choice of protection method, but in complex situations may require additional analysis or consultation with specialists. Able to prepare documentation for intellectual property protection, but it may require revision. Generally makes rational decisions, but may not take into account some strategic or economic factors. Keeps abreast of developments in the field of intellectual property, but does not always apply the latest methods in practice.	Deeply understands the laws and regulations governing the protection of intellectual property, including patent law, copyright, trademarks and related rights. Confidently analyzes intellectual property and selects the most effective protection methods depending on the specifics of the development or scientific work. Able to competently prepare applications for patents, copyright certificates, register trademarks and draw up licensing agreements. Explains and justifies the choice of protection method, taking into account economic, legal and strategic aspects. Monitors changes in legislation and implements modern approaches to protecting intellectual property. Provides advice to colleagues and helps organize the process of

	developments, which can lead to legal risks or denial of patent registration. Does not know how to work with patent databases, performs searches insufficiently comprehensively or with errors. Patent research reports do not meet requirements, contain incomplete or inaccurate data. Does not follow changes in patent legislation and shows no interest in studying modern methods of patent analysis.	information searches but may not fully assess the novelty and patentability of a development. Analyzes only a limited range of sources, which may lead to incomplete or inaccurate conclusions. Able to prepare a report, but it requires significant revisions and additions. Updates his knowledge in the field of patent analysis irregularly, which reduces the effectiveness of research.	Has strong knowledge in the field of patent research and is able to analyze technical solutions from the point of view of patent law. Performs searches and analysis of patent information, but may not take into account some specific aspects of international patent law. Formulates well-founded conclusions about the patent purity of developments, but in complex cases requires additional consultations with specialists. Able to prepare a patent research report, but may not always consider all potential legal risks. Keeps abreast of new trends in the patent field, but does not always apply the latest search and analysis methods.	protecting intellectual property in scientific and industrial projects. He has a deep understanding of patent law, regulations, and international agreements governing the protection of intellectual property in the field of computing and communications systems. Confidently conducts patent research, analyzes existing patents, and determines the patent purity of developed solutions. Uses specialized databases (WIPO, EPO, USPTO, Rospatent, etc.) to search and analyze patent information. Provides sound assessments of the novelty and patentability of technical solutions and develops strategies for protecting intellectual property. Competently prepares patent research, compiles reports with a detailed analysis of the technological landscape and potential legal risks.
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<i>Competence: PC- 8 Capable of participating in the management of projects for the creation of information systems and software systems at various stages of the life cycle</i>				
ID-1 PC- 8 Manages the development, development and maintenance of information systems and software systems ID-2 PC- 8 Knows and applies software development trends in his/her professional activities	Struggles to manage the development of information systems and software packages. The development process is disorganized , and errors are made in the design and maintenance of systems. Management and maintenance tasks are performed irregularly or with serious shortcomings, resulting in non-compliance with requirements. It is impossible to ensure the stable operation of software packages and timely support. Struggles to identify and apply software development trends in their professional activities. Knowledge of current trends is limited, and their use in work is minimal. Unable to adapt their work	Manages the development of information systems and software packages, but with some errors in the process. System development and support are underway, but in some cases, there is a lack of organization or attention to detail. Project management sometimes fails to meet all standards, leading to slowdowns or some flaws in software packages. Has basic knowledge of software development trends , but their application in professional work is limited. Knowledge of current trends is not always fully utilized. Sometimes, new technologies and methods fail to	Effectively manages the development, implementation , and maintenance of information systems and software systems. The development process is organized, tasks are accomplished effectively, but in some cases, improved interactions between the development and maintenance phases could be achieved. Project management complies with standards, but there is room for further process optimization and improved system maintenance. He is well-versed in software development trends and	Expertly manages the development, implementation, and maintenance of information systems and software suites. All stages of system development and maintenance are organized and executed to a high standard, using advanced methods and tools. The project management process is optimized, allowing for prompt response to changes and ensuring stable system operation. He is knowledgeable and actively applies current software development trends in his professional work. Knowledge of trends and the latest technologies is integrated into development processes, allowing for increased efficiency and innovation . The use of new technologies and methods fully

	to new technologies and approaches, which reduces the effectiveness of their work with software. Significant improvement is required in understanding and applying current software trends.	be effectively applied, which can reduce the effectiveness of software development and support processes. Potential exists for improvement and more active implementation of new approaches.	utilizes them in his professional work. His knowledge of current trends is often applied to project work, but could be further enhanced by deepening the implementation of new technologies or more widely applying advanced methods. Overall, he utilizes trends effectively, but there is room for further growth and improvement in this area.	meets modern requirements and is actively implemented into projects to improve their quality and performance.
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Competency: PC- 9 Able to take into account knowledge of the problems and trends in the development of the software market in professional activities

ID-1 PC- 9 Selects software for their professional activities, taking into account market development trends. ID-2 PC- 9 Takes into account the development trends of the software market and applies these development trends in professional activities	Struggles to select software for their professional activities without considering current market trends. They often choose outdated or inappropriate software, which reduces work efficiency. They lack a deep understanding of current trends, and their software choices don't align with the needs of the modern market. Significant improvements are needed in selecting software solutions based on market	They select software for their professional activities, but to some extent ignore current market trends. Sometimes, the chosen solutions do not meet all the requirements of the modern industry, which can reduce their effectiveness. Knowledge of market trends is applied to a limited extent, and the software choice is not always optimal from a long-	Selects software appropriately for their professional activities, taking into account market trends. Knowledge of current software trends is used to inform decision-making, but new or more suitable solutions may sometimes be missed. Overall, software selection is up-	She wisely selects software for her professional work, taking into account current market trends. She carefully analyzes current and emerging developments, enabling her to select the most effective and innovative solutions. She skillfully adapts her solutions to changes in the software market, which helps increase productivity and maintain a high level of work.
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	dynamics. Fails to consider software market development trends in their professional activities. Lack of understanding of current software trends leads to the selection of outdated and ineffective solutions. New technologies are not implemented, reducing professional effectiveness. Significant improvement is needed in the analysis and application of software market development trends.	term perspective. While it takes into account certain software market development trends, the application of these trends in professional work is limited. Knowledge of new technologies and trends is not always used effectively. In some cases, it is not possible to fully integrate modern approaches and methods into work, which hinders the improvement of work processes. The application of development trends requires further development.	to-date, but there is room for improvement by considering a broader picture of trends. Considers current software market trends and applies them to their professional work. Modern technologies and methods are integrated into work processes, but there are sometimes opportunities for deeper implementation of new solutions. Adopting software development trends contributes to improved work results, but there is room for further refinement.	She intelligently considers and actively applies current software market trends in her professional work. She continuously analyzes market changes and implements cutting-edge technologies and methods, which contributes to increased efficiency and innovation. Applying these trends leads to significant improvements in professional performance, ensuring high results and competitiveness.
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Competency assessment criteria *

" excellent " grade is awarded to the student if employee responsibilities are clearly assigned and effective coordination is ensured. A detailed work plan, including deadlines, resources, and milestones, is developed and implemented. Modern personnel management methods are successfully applied, and employee motivation is ensured. Emerging issues in the production process are quickly and effectively resolved. Strategies for improving labor efficiency and minimizing costs are implemented. Production activities are organized in full compliance with regulatory requirements. The presentation is clearly structured and contains a logical sequence of presentation. All key aspects of the plan or performance results are presented, and reliable data is used. The slides are professionally designed, with discreet graphics, legible fonts, and a uncluttered color scheme. The presenter presents the material confidently and clearly, uses expressive language, and maintains eye contact. The presentation is

accompanied by explanations and examples, and questions for the audience or interactive elements are possible . During a team presentation, the speakers are coordinated, roles are logically assigned, and teamwork is smooth. Confidently answers questions from the audience, demonstrating an understanding of the topic and the ability to argue their point of view. A comprehensive analysis of the problem has been completed, taking into account all relevant aspects (social, ethical, scientific, and technical). Conclusions follow logically from the analysis, are substantiated, and supported by reliable sources and facts. Scientific approaches, analytical methods, comparative, critical, and systemic analysis are applied. Social and ethical aspects are taken into account, and the proposed solutions comply with professional ethics. Conclusions and proposed solutions are applicable in practice, taking into account the real conditions of professional activity. The text is presented clearly, logically, and without stylistic and grammatical errors. Demonstrates a comprehensive understanding of cultural diversity, taking into account historical, social, and economic contexts. Analyzes cultures without stereotypes and bias, using scientific sources and reliable data. Clearly articulates the unique characteristics of different cultures, highlighting their distinctive features. Competently compares cultures, identifying their similarities and differences based on logical arguments. Shows respect for cultural traditions, uses terminology correctly, and demonstrates a high level of intercultural competence. Information is presented logically, consistently, clearly, and without stylistic errors. Has a thorough understanding of laws and regulations governing intellectual property protection, including patent law, copyright, trademarks, and related rights. Confidently analyzes intellectual property and selects the most effective protection methods depending on the specifics of the development or scientific work. Can competently draft patent applications, copyright certificates, register trademarks, and draft licensing agreements. Explains and justifies the choice of protection method, taking into account economic, legal, and strategic aspects. Keeps abreast of legislative changes and implements modern approaches to intellectual property protection. Consults colleagues and helps organize the intellectual property protection process in scientific and industrial projects. Has a thorough understanding of patent law, regulations, and international agreements governing intellectual property protection in the field of computing and communication systems. Confidently conducts patent research, analyzes existing patents, and determines the patentability of developed solutions. Utilizes specialized databases (WIPO, EPO, USPTO, Rospatent, etc.) to search and analyze patent information. Provides sound assessments of the novelty and patentability of technical solutions and develops intellectual property protection strategies. Expertly prepares patent research and compiles reports with a detailed analysis of the technological landscape and potential legal risks. Monitors patent trends and new developments in computing and communications systems, applying current research methods. Expertly manages the development, implementation, and maintenance of information systems and software suites. All stages of system development and maintenance are organized and executed to a high standard, utilizing cutting-edge methods and tools. A streamlined project management process allows for prompt response to changes and ensures stable system operation. Knowledgeable and proactively applies current software development trends in her professional activities. Knowledge of trends and the latest technologies is integrated into development processes, enhancing efficiency and innovation . The use of new technologies and methods fully meets modern requirements and is actively implemented into projects to improve their quality and productivity. She wisely selects software for her professional work, taking into account current market trends. She thoroughly analyzes current and future developments, enabling her to select the most effective and innovative solutions. She skillfully adapts her solutions to changes in the software market, which contributes to increased productivity and maintaining a high level of work. She competently considers and actively applies current software market trends in her professional work. She constantly analyzes market changes and implements cutting-edge technologies and methods, which contributes to increased efficiency and innovation . The application of these trends leads to significant improvements in her professional work, ensuring high results and competitiveness.

" **good**" rating is given to the student if responsibilities are assigned, but there may be minor deficiencies in coordination. The work plan is developed and implemented, but minor deviations from the schedule are possible. Management is good, but minor issues with staff motivation may exist. Problems are resolved in a timely manner, but minor delays or shortcomings in the process are possible. Basic efficiency improvement methods are applied, but the optimization potential has not been fully realized. Production activities meet key standards, but minor omissions may occur. The presentation is logically structured, but minor deficiencies in the presentation logic may occur. The main information is presented, but some aspects may be superficial. The presentation design is generally high-quality, but text overload or minor visual flaws may occur. The presenter presents the material confidently, but minor hesitations or monotony are possible. There are attempts to interact with the audience, but this is not always effective. There is interaction between the speakers, but there may be a lack of coordination or an uneven distribution of roles. The audience's questions are generally answered, but some answers may not be fully detailed. The analysis covers the main aspects of the problem, but may lack detail. Conclusions are generally logical and well-founded, but the argumentation may be incomplete or not always convincing. Basic analytical methods are used, but not thoroughly explored. Social and ethical aspects are generally considered, but the analysis of these factors may not be comprehensive enough. The solutions are applicable, but require revision or adaptation to specific conditions. The text is logical and literate, but may contain minor stylistic or structural errors. Explains the topic well, but may overlook some aspects (for example, economic or historical influences). Generally objective, but may contain minor stereotypical or superficial judgments. Describes key characteristics of cultures, but does not always emphasize unique features. Attempts to compare cultures, but not always with clear argumentation. Demonstrates respect for cultural differences, but may not take into account all the nuances of intercultural communication. The text is logical and literate, but may contain minor stylistic or structural errors. Possesses a solid knowledge of intellectual property protection, but may not always take into account all the nuances of specific cases. Makes appropriate protection method choices, but in complex situations may require additional analysis or consultation with specialists. Able to prepare documentation for intellectual property protection, but this may require revision. Generally makes rational decisions, but may not take into account certain strategic or economic factors. Follows developments in the field of intellectual property, but does not always apply the latest methods in practice. Possesses a solid knowledge of patent research and is able to analyze technical solutions from a patent law perspective. Searches for and analyzes patent information, but may not take into account certain specific aspects of international patent law. Formulates well-founded conclusions about the patent purity of developments, but in complex cases requires additional consultation with specialists. Able to prepare a patent research report, but may not always consider all potential legal risks. Aware of new trends in the patent field, but does not always apply the latest search and analysis methods. Properly manages the development, development, and maintenance of information systems and software packages. The development process is organized, tasks are accomplished effectively, but in some cases, improved interaction between the development and maintenance stages could be achieved. Project management complies with standards, but there is room for further optimization and improved system support. This professional is well-versed in software development trends and applies them to their work. This knowledge of current trends is often applied to project work, but could be improved by more deeply embracing the latest technologies or more widely applying best practices. Overall, these trends are utilized effectively, but there is room for further growth and improvement in this area. This professional selects software appropriately for their work, taking into account market trends. This professional utilizes knowledge of current software trends to inform decision-making, but new or more suitable solutions may sometimes be missed. Overall, software selection is up-to-date, but there is room for improvement by considering a broader picture of trends. This professional considers current

software market trends and applies them to their work. Modern technologies and methods are integrated into work processes, but there is sometimes room for more in-depth implementation of new solutions. Applying software development trends contributes to improved work results, but there is room for further refinement.

" satisfactory " rating is given to a student if there are gaps in the distribution of responsibilities and coordination of staff. Planning is in place, but there are significant delays and insufficient control. Personnel management is basic, and employee motivation is weak. Problems are resolved late or incompletely. A systematic approach to improving efficiency and reducing costs is lacking. Production activities are irregular, and there are organizational and regulatory shortcomings. The presentation is poorly structured, with fragmented flow. Only the main points are presented, with important details or evidence missing. The slide design is overloaded with text, poor color combinations, or sloppy elements. The presentation is monotonous, with frequent hesitation and a lack of expressiveness. Interaction with the audience is minimal, and the presentation resembles a monologue. During a team presentation, there is a lack of coordination among the speakers, and roles are unevenly distributed. Answers to audience questions are difficult, and there may be uncertainty or deviations from the topic. The problem is addressed superficially, lacking a comprehensive approach. Conclusions are insufficiently substantiated, contain logical gaps, or are weakly argued. The application of analytical methods is formal or limited to a single approach. Social and ethical aspects are only partially addressed or treated superficially. Conclusions and recommendations are difficult to implement in practice and require significant revision. The text contains stylistic and logical errors, and the presentation is unclear in places. The author treats cultural diversity superficially, without elaborating on aspects in depth. Stereotypes are possible, and critical analysis is lacking. Provides general facts but does not emphasize the unique features of cultures. Cultural comparisons are formal or limited to simple statements. Is respectful, but may use inappropriate terminology or simplistic generalizations. The text contains logical and stylistic errors, and the presentation is not clear enough. Knows the basic methods of protecting intellectual property, but may have difficulty choosing the optimal method. Is able to prepare basic documentation, but requires the assistance of specialists for complex legal issues. Doesn't always consider all risks when choosing a protection method, which may result in insufficient legal protection for a property. Has a superficial knowledge of patenting, licensing, and copyright. Updates their knowledge infrequently, which may result in the use of outdated protection methods. Has a general understanding of patent research, but struggles with analyzing complex technical solutions. Searches for patent information, but may not fully assess the novelty and patentability of a development. Analyzes only a limited range of sources, which may lead to incomplete or inaccurate conclusions. Can prepare a report, but it requires significant revision and additions. Updates their knowledge of patent analysis infrequently, which reduces the effectiveness of research. Manages the development of information systems and software packages, but with some errors in the process. Development and support of systems is complete, but in some cases, work organization or attention to detail is insufficient. Project management sometimes does not meet all standards, which leads to slowdowns or some defects in software packages. Has basic knowledge of software development trends, but its application in professional activities is limited. Knowledge of current trends is not always fully utilized. New technologies and methods are sometimes not effectively applied, which can reduce the effectiveness of software development and support processes. Potential exists for improvement and more active implementation of new approaches. Selects software for their professional activities, but to some extent ignores current market trends. Sometimes, the chosen solutions do not meet all the requirements of the modern industry, which can reduce their effectiveness. Knowledge of market trends is applied to a limited extent, and software selection is not always optimal from a long-term perspective. Considers some software market development trends, but the application of these trends in professional activities is limited. Knowledge of new technologies and trends is

not always effectively applied. In some cases, modern approaches and methods cannot be fully integrated into work, which hinders the improvement of work processes. The application of development trends requires further development.

" failing " grade if there is a lack of clear division of responsibilities and chaotic workflow. Planning is absent or perfunctory, and oversight is minimal. Management is ineffective, with a lack of motivation and control over employees. Emerging problems are ignored or resolved in a timely manner. Production processes are not optimized, potentially resulting in significant losses of time and resources. Production activities are conducted with serious violations of regulatory requirements. The presentation lacks a clear structure, and the sequence of information delivery is chaotic. Key aspects of the topic are poorly covered or absent, and the materials are poorly prepared. Slides are overloaded with text, illegible, or poorly formatted. The presenter reads without expression, uses poor intonation, and stutters frequently. There is no interaction with the audience, and the material is presented formally. The team lacks coordination, and presenters fail to coordinate information with each other. The presenter either does not answer questions or does so hesitantly, with errors and deviations from the topic. Analysis is absent or fragmentary. The conclusions are unsubstantiated and contain logical errors. Scientific methods of analysis are not used, and a systematic approach is lacking. Social and ethical aspects are ignored, and the proposed solutions do not comply with professional ethics. The conclusions are impractical and have no value for professional activity. The text is poorly structured, contains numerous errors, and is unclear. Culture is treated superficially or with errors, and a deep understanding of the topic is lacking. Biased judgments and stereotypes are present, and there is a lack of critical analysis of the information. Failure to differentiate between cultures or makes significant errors in description. Comparative analysis is absent or is made without argumentation. Inappropriate statements are made, and cross-cultural specifics are not taken into account. The text is unstructured and contains numerous grammatical and stylistic errors. The author lacks sufficient knowledge of intellectual property protection and is unable to make an informed choice of protection method. Errors in document preparation may result in denial of registration or vulnerability of intellectual property rights. Failure to consider legal risks, which may lead to the loss of exclusive rights to a development or scientific work. Shows no interest in studying legislation and modern methods of intellectual property protection. Incapable of consulting colleagues or participating in the process of legal protection of intellectual property. Lacks knowledge of patent research methods and is unable to correctly analyze patent information. Makes errors in assessing the patentability of developments, which may lead to legal risks or denial of patent registration. Unable to work with patent databases, performs incomplete or error-filled searches. Patent research reports do not meet requirements and contain incomplete or inaccurate data. Does not monitor changes in patent legislation and shows no interest in studying modern methods of patent analysis. Struggles to manage the development of information systems and software packages. The development process is disorganized, and errors are made in the design and maintenance of systems. Tasks related to management and maintenance are performed irregularly or with serious flaws, resulting in non-compliance with requirements. Failure to ensure the stable operation of software packages and timely support. Struggles to identify and apply software development trends in professional activities. Knowledge of current trends is limited, and their use in work is minimal. Failure to correctly adapt their actions to new technologies and approaches, which reduces the effectiveness of their work with software. Significant improvement is required in understanding and applying current software trends. Difficulty selecting software for their professional activities without taking current market trends into account. Often, outdated or inappropriate software is selected, which reduces work efficiency. Lack of a deep understanding of current trends, and software selection does not meet modern market requirements. Significant improvement is required in selecting software solutions taking market dynamics into account. Failure to consider software market development trends in their professional activities. Lack of

understanding of current software trends, which leads to the selection of outdated and ineffective solutions. New technologies are not implemented into work, which reduces the effectiveness of their work. Significant improvement is required in analyzing and applying software market trends.

1. Tasks to assess knowledge gained in practice (basic level)

Controlled competencies or their parts (competence code)	Formulation of the task	
UK-3 UK-5 PC-4 PC-8 PC-9	Task 1	Develop proposals for the use in practical activities of the results obtained during the completion of educational assignments.
	Task 2	Study the mathematical model of the corresponding type.
UK-3 UK-5 PC-4 PC-8 PC-9	Task 1	Apply algorithmic and software solution in the relevant field.
	Task 2	Apply mathematical modeling methods in the relevant field.

2. Tasks to assess knowledge gained in practice (advanced level)

Controlled competencies or their parts (competency code)	Formulation of the task	
UK-3 UK-5 PC-4 PC-8 PC-9	Task 1	Develop proposals for the practical use of the results obtained during the completion of educational assignments, taking into account the specifics of the processes and phenomena being studied.
	Task 2	To study the mathematical model of the corresponding type and conduct a comparative analysis.
UK-3 UK-5 PC-4 PC-8 PC-9	Task 1	Develop and implement an algorithmic and software solution in the relevant field.
	Task 2	Develop a mathematical model in the relevant area.

3. Tasks to assess skills and abilities acquired in practice (basic level)

Controlled competencies or their parts (competence code)	Formulation of the task	
UK-3 UK-5 PC-4 PC-8 PC-9	Task 1	Develop proposals for the use in practical activities of the results obtained during the completion of educational assignments.
	Task 2	Study the mathematical model of the corresponding type.
UK-3	Task 1	Apply algorithmic and software solution in the relevant

UK-5		field.
PC-4	Task 2	Apply mathematical modeling methods in the relevant field.
PC-8		
PC-9		

4. Tasks that allow you to assess the skills and abilities acquired in practice (advanced level)

Controlled competencies or their parts (competency code)	Formulation of the task	
UK-3 UK-5 PC-4 PC-8 PC-9	Task 1	Develop proposals for the practical use of the results obtained during the completion of educational assignments, taking into account the specifics of the processes and phenomena being studied.
	Task 2	To study the mathematical model of the corresponding type and conduct a comparative analysis
UK-3 UK-5 PC-4 PC-8 PC-9	Task 1	Develop and implement an algorithmic and software solution in the relevant field
	Task 2	Develop a mathematical model in the relevant field

5. Methodological materials defining the procedures for assessing knowledge, skills, abilities and (or) work experience, characterizing the stages of competence development

The procedure for passing the production The practice includes the following stages:

- preparatory;
- functional- activity-based ;
- final.

At each stage of the internship, ongoing monitoring of competency development is carried out. The tasks offered to the student allow them to test competencies: UK-3, UK-5, PC-4, PC-8, and PC-9.

The assignments require mastery of competencies at different levels: basic and advanced . At the basic level, students are expected to use known methods and technologies to solve production problems, while at the advanced level, a heuristic approach to solving assigned production tasks is added.

When checking assignments, the following are assessed:

- consistency and rationality of task execution;
 - quantity and quality of studies conducted;
- independent contribution to the range of issues studied.

When checking reports, the following are assessed:

- correctness of design;
- quality of the results presented;
- the quality of the presented graphic and tabular material.

When defending a report, the following are assessed:

- the student's proficiency in the material being presented;
- independence of judgment;
- the ability to make informed conclusions.